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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,546	03/07/2007	Clive Marcus Tunna	M04B100	9468

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EXAMINER	
KASTURE, DNYANESH G	
ART UNIT	PAPER NUMBER
3746	

NOTIFICATION DATE	DELIVERY MODE
02/14/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

LORETTA.SANDOVAL@EDWARDSVACUUM.COM

Office Action Summary	Application No.	Applicant(s)	
	10/578,546	TUNNA ET AL.	
	Examiner	Art Unit	
	DNYANESH KASTURE	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-10,12,13 and 15-38* is/are pending in the application.

4a) Of the above claim(s) *5-8,19-21,30-32 and 34-37* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,9,10,12,13,15-18,22-29,33 and 38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. The previously made objections to Claims 12 and 18 are hereby withdrawn in view of amendments to those claims submitted on 01 December 2010.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as **"means"** and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. In the instant abstract, the phrase “Means (100, 102)" is legal phraseology.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 2, 9, 10, 12, 13, 15 - 18, 22 - 29, 33 and 38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

6. In Re Claim 1, the limitation "move in sync without any relative movement therebetween in an axial direction" is not supported by the original specification and therefore constitutes new matter. Page 7, Lines 1 - 2 of applicant's disclosure states: "The means for effecting axial movement of the rotors is preferably arranged so as to ensure both rotors are maintained in the same axial position". However, ensuring both rotors are maintained in the same axial position is not the same as moving the rotors in sync without any relative movement therebetween. Figure 8 of applicant's drawings discloses a bearing housing/piston (88) that houses bearings (86) for both rotor shafts, but that does not necessarily mean that both shafts move in sync upon rotation of lead screw (104) because there could be backlash between the bearing and the shaft of the rotor. There is no disclosure of any elements that prevent backlash between the shaft and the bearing. For instance, see prior art made of record in the Conclusions section, where Whitenack discloses a shaft (21) and bearing (24) along with a structure including a spring (28) which does not allow backlash of the shaft (Page 2, Column 1, Lines 23 - 26). Clearly the rotors are not directly connected or fixed to

each other to prevent relative movement therebetween. It would therefore not be clear to one skilled in the art that the inventor had possession of this claimed limitation.

7. The previously made 112 2nd paragraph rejection of Claim 29 is hereby withdrawn in view of amendments to the claim submitted on 01 December 2010.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by McCormick et al (US Patent 3,605,188 A)

10. In Re Claim 1, the limitation "means for effecting axial movement of the rotors" NO LONGER meets the three-prong test per MPEP 2181 and therefore DOES NOT invoke 35 USC 112 6th paragraph. The reason why it does not meet the three-prong test is because the means has been modified by a specific structure for achieving the specified function (axial movement). The specific structure drives the bearing assembly in a manner where the first and second rotors move in sync.

11. McCormick et al discloses a dry pump (Figure 4 embodiment) comprising a stator (30, 31, 32) that houses first (25, 27) and second (26, 28) intermeshing screw rotors adapted for (are capable of) counter-rotation within the stator as depicted, and an apparatus for effecting axial movement of the rotors within the stator to vary at least one clearance between the rotor and stator as suggested in Column 2, Lines 54-56: "It can be seen that axial adjustment of said screws 25 and 26 will vary the clearance between the screw flights 27 and 28 and the respective conical bores 30 and 31 of the cylinder 32", during the use of the pump as suggested in Column 3, Lines 5-9: "Moreover, such adjustment may be accomplished automatically in response to head pressure by providing a pressure sensor (not shown) at the die inlet which then provides a signal to move the screws forward or rearward as necessary to increase or decrease the head pressure sensed by the sensor". The rotors being mounted on their respective shafts (25) and (26) that are rotatably supported through sleeves (8) and (9) by a bearing assembly (10, 11)

- With regards to the claim limitation "wherein the means drives the bearing assembly in a manner where the first and second rotors always move in sync without any relative movement therebetween in an axial direction", McCormick et al clearly suggests in Column 3, Lines 1 – 4: "The screw adjusting mechanism herein shown is to be regarded AS MERELY EXEMPLARY and it is apparent that other well known mechanisms may be employed, and, in fact, BOTH SCREWS MAY BE SIMULTANEOUSLY ADJUSTED". The simultaneous adjustment reads on both rotors being moved in sync as claimed. Additional clarification is provided by McCormick et al

in Column 3, Lines 7-8: "provides a signal to MOVE THE SCREWS FORWARD OR REARWARD", thereby suggesting a simultaneous adjustment forward or rearward. Please also note that this claimed limitation is now a functional limitation which does not structurally limit the claim, especially since 112 6th paragraph is no longer invoked. MPEP 2114 clearly states in the title of the third paragraph: "MANNER OF OPERATING THE DEVICE DOES NOT DIFFERENTIATE APPARATUS CLAIM FROM THE PRIOR ART"

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. Alternatively, Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A)

14. In Re Claim 1, Fang et al discloses a dry pump (Figure 3) comprising a stator and first and second intermeshing screw rotors adapted for counter-rotation within the stator as described in Column 1, Lines 39-44. Fang et al also discloses the rotors being

mounted on their respective shafts rotatably supported by a bearing assembly as clearly depicted.

15. However, Fang et al does not disclose means for effecting axial movement of the rotors as claimed to vary a clearance between the rotors and the stator. Note that the limitation "means for effecting axial movement of the rotors" NO LONGER meets the three-prong test per MPEP 2181 (as discussed earlier) and therefore DOES NOT invoke 35 USC 112 6th paragraph.

16. Nevertheless, McCormick et al discloses in Column 2, Lines 54-56: "It can be seen that axial adjustment of said screws 25 and 26 will vary the clearance between the screw flights 27 and 28 and the respective conical bores 30 and 31 of the cylinder 32", during the use of the pump as suggested in Column 3, Lines 5-9: "Moreover, such adjustment may be accomplished automatically in response to head pressure by providing a pressure sensor (not shown) at the die inlet which then provides a signal to MOVE THE SCREWS FORWARD OR REARWARD as necessary to increase or decrease the head pressure sensed by the sensor". McCormick et al also suggests in Column 3, Lines 1 – 4 that the screw adjusting mechanism is merely exemplary and that OTHER WELL KNOWN MECHANISMS MAY BE EMPLOYED, "and, in fact, both screws may be SIMULTANEOUSLY adjusted". To one of ordinary skill, a simultaneous adjustment suggests moving both rotors in sync.

17. It would have been obvious to a person having ordinary skill in the art at the time of the invention that moving the screws of Fang et al axially will vary the clearance between the screws and conical bores, thereby allowing head pressure to be controlled

automatically during operation as suggested by McCormick et al, and would therefore be motivated to modify the screw rotor assembly of Fang et al in a way that allows axial movement of the rotors in sync for the purpose of controlling the head pressure.

18. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and further in view of Olofsson (US Patent 3,947,163 A)

19. In Re Claim 2, McCormick et al as applied to Claim 1 discloses that the means for effecting axial movement of the rotors is configured to effect axial movement of the rotors in response to head pressure read by a sensor (Column 3, Lines 5-6). However, McCormick et al does not explicitly state that axial movement is effected in response to the axial load. Nevertheless, it would have been obvious to a person having ordinary skill in the art at the time of the invention that the axial movement is also in response to the axial load because the axial load follows from the pressure of the working medium against the end of the screw thread rotor as stated by Olofsson in Column 1, Lines 22-24: “According to prior suggestions the bearings of the screw thread rotor are exposed to the entire axial load which follows from the pressure of the working medium against the end of the screw thread rotor”.

20. Claims 9, 10, 12, 15,-18, 22-23, 28-29, 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and further in view of Shaw (US Patent 6,003,324 A)

21. In Re Claim 9, Fang et al and McCormick et al as applied to Claim 1 discloses all the claimed limitations except for control means for actively controlling operation of the means for effecting axial movement of the rotors. The limitation "means for actively controlling operation" meets the three-prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. In the instant specification, page 13, Lines 14-16, the said means for actively controlling operation in Figure 8 is the controller (108).

22. Nevertheless, Shaw discloses a bearing mechanism that allows for axial movement as follows: Shaw discloses a first screw rotor (14) and a second screw rotor (16) that are housed in first bearing housing (300) and second bearing housing (306) respectively, the bearings housings are attached to their respective actuators (366, 384) by pins (376, 394). Note that the bearing housings are free to move within respective openings (304, 309) of the stator (220) as suggested in Column 5, Line 63 – Column 6, Line 3: "sufficient for allowing shifting (in Fig. 3 vertical displacement) of bearing". The actuators (366, 384) have threaded follower sleeves (368, 386) respectively. The threaded follower sleeves are coupled to respective drive shafts (372, 390 which are equivalent to applicant's lead screw) of stepper motors (360, 380) respectively. Shaw also discloses in Column 7, Line 67 – Column 8, Line 1 that the stepper motors (360) and (380) are controlled by microprocessor (454) via line (478). This apparatus for

actively controlling operation is equivalent of applicant's means for actively controlling operation because it performs the same function in substantially the same way and produces substantially the same result (MPEP 2183). Note that Shaw also discloses additional bearings (72) and (78) respectively at the other end of the screw rotors.

23. It would have been obvious to a person having ordinary skill in the art at the time of the invention to substitute the bearings of Fang et al with the axially movable bearing assembly, actuator, motor of Shaw that supports each screw rotor on both sides, and also to incorporate the microprocessor of Shaw to control the axial movement of both rotors for the purpose of precise control of movement resulting from the use of stepper motors as stated by Shaw in Column 7, Lines 16-18: "As it is preferred that this movement be precisely controlled .. .. stepper motors are well suited for such applications". Note that in the modified apparatus, the microprocessor taught by Shaw would be programmed to simultaneously move the rotors (in sync) during adjustment as suggested by McCormick et al.

24. In Re Claim 10, Shaw discloses actuator block (366) and actuator block (368). The controller controls the motor which in turn controls the actuator through shaft (372 or 390).

25. In Re Claim 12, Shaw discloses a motor (360 or 380) for rotating a drive shaft (372 or 390) engaging the actuator (366 or 368). The microprocessor (454) is configured to control operation of the motor by line (478).

26. In Re Claim 15, the combination of the outer race of bearing (300 or 306), pins (376 or 394) and actuator (366 or 368) of Shaw read on part of a housing for the bearing assembly, of which the actuator is a part of.

27. In Re Claim 16, the wall components of the housing of Fang et al would clearly have to be assembled in a sealing manner for the apparatus to work, therefore the housing includes a sealing mechanism that is internal to the pump as claimed.

28. In Re Claim 17, Figure 3 of Fang et al clearly defines the end surface of the stator facing both end faces of the screw rotor.

29. In Re Claim 18, Shaw discloses another bearing assembly (72) and (78) respectively at the other end of the screw rotors from bearing (300) and bearing (306) that support one end of each of the rotors.

30. In Re Claim 22, the limitation "means for detecting the value of an operational parameter" meets the three-prong test per MPEP 2181 and thereby invokes 35 USC 112 6th paragraph. In the instant specification, page 14, Lines 31-32, the said means for actively controlling operation in Figure 8 is a sensor that monitors pressure, power consumption etc. McCormick et al discloses a sensor that monitors head pressure (Column 3, Line 6). This apparatus for detecting the value of an operational parameter

is equivalent of applicant's means for detecting the value of an operational parameter because it performs the same function in substantially the same way and produces substantially the same result (MPEP 2183). McCormick et al is configured to control the means for effecting axial movement in response to pressure (detected value of operational parameter) as stated in Column 3, Lines 4-6: "adjustment may be accomplished automatically in response to head pressure by providing a pressure sensor".

31. In Re Claim 23, the head pressure read by the sensor of McCormick et al reads on backpressure as claimed.

32. In Re Claim 28, determining the optimum value for the rate of increasing the size of clearance or decreasing the size of clearance would be obvious to one of ordinary skill in the art because it has been held that discovering the optimum value of a result effective variable involves only routine skill in the art – MPEP 2144.05 (II-B). Note that it is well known that stepper motors can be operated at different rates.

33. In Re Claim 29, the rotors of Fang et al have a taper, where the outer diameter of each rotor decreases from the inlet (901) to the outlet.

34. In Re Claim 33, the rotors of Fang et al are clearly externally threaded as depicted in Figure 3.

35. Claims 13 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Kelley et al (US Patent 4,299,794 A)

36. In Re Claim 13, the drive shaft (372 or 390) of Shaw is coupled to a threaded follower sleeve (368 or 386) which reads on the conformingly threaded aperture in the actuator. It is likely that the drive shaft of Shaw is a lead screw because it is coupled to a threaded collar, however, Shaw (and McCormick et al and Fang et al as applied to Claim 12) does not explicitly state that the drive shaft is a lead screw.

37. Nevertheless, Kelley et al discloses that a stepper motor (76) drives a lead screw (66) which engages a threaded element (64).

38. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate a lead screw as taught by Kelley et al as the drive shaft of Shaw because lead screws advantageously have a large load carrying capability.

39. In Re Claim 24, Fang et al, McCormick et al and Shaw as applied to Claim 9 discloses all the claimed limitations except for a sensor capable of detecting the amount of axial clearance between the rotors and the stator.

40. Nevertheless, Kelley et al discloses a stepper motor (76) drives a lead screw (66) which engages a threaded element (64), and sensors (82, 84) that "indicates an axial index position of piston" (Column 5, Line 5).

41. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate a position sensor as taught by Kelley et al at the drive shaft/lead screw of Shaw for the purpose of providing position feedback to the controller of Shaw so that axial movement can be "precisely controlled" (Column 7, Line 14 of Shaw). Note again that axial adjustment varies the clearance between the screw rotors and the conical bores (Column 2, Lines 55-57 of McCormick et al).

42. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Moore (US Patent 6,004,271 A)

43. In Re Claim 25, Fang et al, McCormick et al and Shaw as applied to Claim 9 discloses all the claimed limitations except for a sensor capable of detecting the rate of change of axial clearance between the rotors and the stator.

44. Nevertheless, Moore discloses a motor (62) that drives lead screw (90) and a sensor (70) that provides speed feedback to controller (26) as stated in Column 7, Lines 23-26: "An optical encoder 70 is also disposed around the drive-shaft 64 and fixably mounted to the main body casing 42, and provides rotational speed feedback data to

the console controller 26 TO CONTROL THE DRIVE MOTOR 62". The speed of the motor corresponds to the rate of change of axial clearance.

45. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate a speed sensor as taught by Moore on the drive shaft of Shaw for the purpose of providing rotational speed feedback to the controller (454) of Shaw to control the motor (360 or 380) of Shaw as suggested by Moore above. Note that a stepper motor is capable of running at different rates.

46. Claim 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Kelley et al (US Patent 4,299,794 A) and Hogan et al (PG Pub US 20020197164 A1)

47. In Re Claim 26, Fang et al, McCormick et al, Shaw and Kelley et al as applied to Claim 24 discloses all the claimed limitations except for a Hall sensor.

48. Nevertheless, paragraph [0063] of Hogan et al discloses a position sensor (58, 62) which provides a signal to the controller indicative of the position of stepper motor (26) and piston (34). In this paragraph, Hogan et al states: "It will be understood by those in the art that many different types of position sensors may be employed for determining and controlling stepper motor position, for example, the sensor 58 could be a Hall effect sensor".

49. It would have been obvious to a person having ordinary skill in the art at the time of the invention to select a Hall effect sensor as suggested by Hogan et al as the position sensor of Kelley et al because it has no added resistance in a sensing circuit.

50. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Peterson (US Patent 4,265,530 A)

51. In Re Claim 27, Fang et al, McCormick et al, Shaw and Peterson as applied to Claim 9 discloses all the claimed limitations except for the controller being capable of sequentially increasing or decreasing the amount of clearance.

52. Nevertheless, Column 1, Lines 34-39 of Peterson discloses a stepper motor that is capable of sequentially moving an item (shutter blades) forward and then in reverse: "wherein a stepper motor is used to sequentially move the shutter blades toward a fully open orientation and then the motor is energized in an opposite directional sense to reverse the direction of movement of the shutter blades and return them in steps to a closed orientation". Therefore, the stepper motor of Shaw can be capable of sequentially increasing and decreasing the size of clearance in the modified apparatus.

53. It would have been apparent to a person having ordinary skill in the art at the time of the invention that when the stepper motor of Peterson is selected as the stepper motor of Shaw, it can be capable of being moved to sequentially increase and decrease

the size of the clearance because selection of Peterson's stepper motor from a finite number of resources is within the capability ordinary skill in the art. If the selection leads to anticipated success, it is likely the product of ordinary skill and common sense and not the product of innovation.

54. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al (US Patent 6,257,839 B1) in view of McCormick et al (US Patent 3,605,188 A) and in view of Shaw (US Patent 6,003,324 A) and further in view of Moore (US Patent 6,004,271 A) and Yang (US Patent 5,912,537 A)

55. In Re Claim 38, Fang et al, McCormick et al, Shaw and Moore as applied to Claim 25 discloses all the claimed limitations except for a Hall effect sensor.

56. Nevertheless, Yang discloses in Column 6, Lines 18-24: "Moreover, although the motor sensor 42 which detects the SPEED(RPM) of the motor 40 is used as in the previous paragraphs as a working model to obtain the lifting information(LI), ONE SKILLED IN ART KNOWS THAT THERE ARE OTHER SENSORS TO DETECT THE ROTATION frequency of the motor 40 such as RPM sensor or HALL SENSOR"

57. It would have been obvious to a person having ordinary skill in the art at the time of the invention that although an optical encoder is provided by Moore to measure rotational speed of the stepper motor, one skilled in the art knows that there are other sensors to detect the speed such as a Hall sensor (as stated above by Yang), and the

motivation to select a Hall type sensor is that it is immune to dust as compared to an optical sensor.

Response to Arguments

58. Applicant has argued on Page 11 of Applicant's Response that none of the prior art references teaches or suggests the claim limitation "the means drives the bearing assembly in a manner where the first and second rotors always move in sync without any relative movement therebetween in an axial direction".

59. Examiner's Response: McCormick et al clearly suggests in Column 3, Lines 1 – 4 that the screw adjusting mechanism is merely exemplary and that OTHER WELL KNOWN MECHANISMS MAY BE EMPLOYED, "and, in fact, both screws may be SIMULTANEOUSLY adjusted". To one of ordinary skill, a simultaneous adjustment suggests moving both rotors in sync. Shaw clearly teaches that the movement of the stepper motor (360/380 which moves the rotor axially) is controlled by microprocessor (454). Since the microprocessor controls the axial movement of both rotor shafts (by control of their respective stepper motors), it would be routine skill to program the microprocessor so that both rotor shafts are adjusted simultaneously as suggested by McCormick.

60. Applicant has argued on Page 13 of Applicant's Response that McCormick fails to suggest or imply the need for the screws to move always in sync in the axial direction.

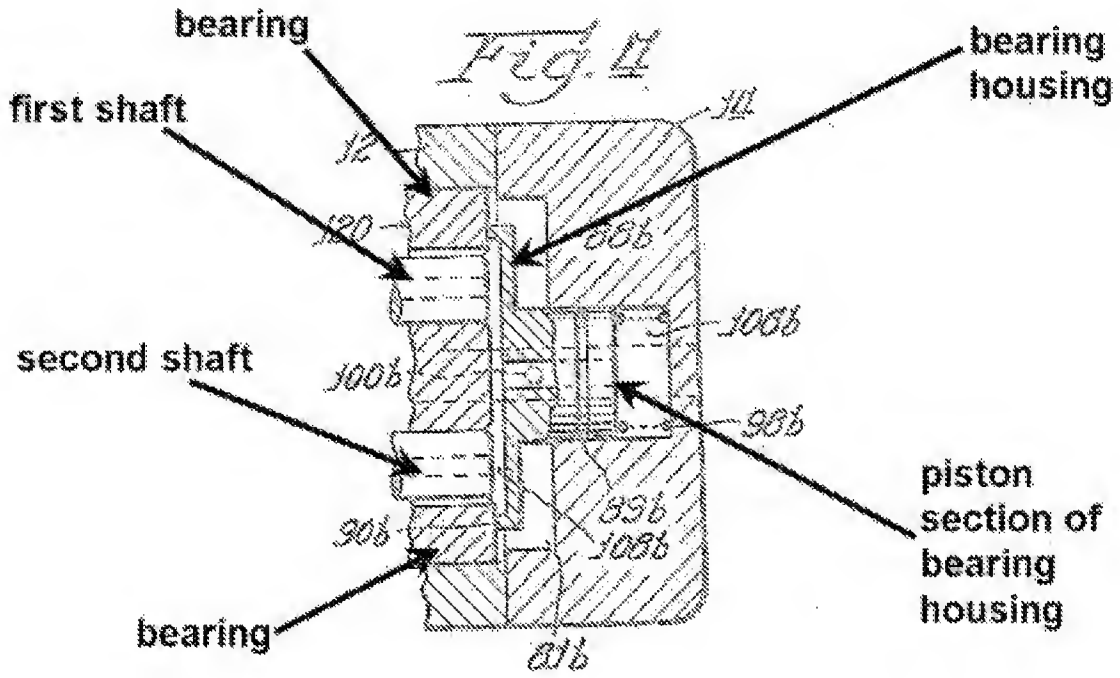
61. Examiner's Response: McCormick et al clearly suggests in Column 3, Lines 1 – 4: "The screw adjusting mechanism herein shown is to be regarded AS MERELY EXEMPLARY and it is apparent that other well known mechanisms may be employed, and, in fact, BOTH SCREWS MAY BE SIMULTANEOUSLY ADJUSTED". The tightening and loosening lock nuts mechanism is therefore merely exemplary, and the teaching of McCormick allows for a mechanism that adjusts both screws simultaneously.

62. Applicant's references to the previously invoked 112 6th paragraph are moot because applicant's amendments no longer meet the three-prong test in MPEP 2181 to invoke the provisions 112 6th paragraph. All of applicant's arguments have been carefully considered, however they are not persuasive for the reasons above. The examiner therefore respectfully disagrees with applicant's arguments.

Conclusion

63. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Whitenack (US Patent 2,343,212 A) discloses a shaft (21) and bearing (24) along with a structure including a spring (28) which does not allow

backlash of the shaft (Page 2, Column 1, Lines 23 - 26). Kinnamon (US Patent 3,296,977 A) discloses a pump in Figure 4 that has a common bearing housing for journal bearings that support the first and second shaft as annotated below.



The common bearing housing acts as a piston which is movable axially.

64. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DNYANESH KASTURE whose telephone number is (571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272 - 7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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